

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT*COMPLIANCE and ENGINEERING*

APPLICATION EVALUATION AND CALCULATIONS

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Date:	3/22/12

PERMIT TO CONSTRUCT

COMPANY NAME: BP WEST COAST PRODUCTS LLC

MAILING ADDRESS: P.O. BOX 6210
CARSON, CA 90749EQUIPMENT ADDRESS: 2350 E. 223rd Street
CARSON, CA 90810**FACILITY PERMIT SECTION H****Process 3: FLUID CATALYTIC CRACKING****SYSTEM 8: CATALYST HANDLING FACILITY NO. 2**

Equipment	ID No.	Conn. To	Emissions and Requirements	Conditions
VESSEL, ADDITIVE SHOT POT, GRACE, MODEL CIS-2452-VM, PORTABLE , NOX REDUCING CATALYST, <u>SOX REDUCING CATALYST, AND CO PROMOTER</u> , WITH <u>PNEUMATIC CATALYST LOADING/UNLOADING</u> MANUAL SYTEM FOR INJECTION OR VACUUM, WIDTH: 5 FT; HEIGHT: 8 FT; LENGTH: 3 FT A/N: 398322 462618	D2658	C2661	PM: (9) [RULE 404, 2-7-1986; RULE 405, 2-7-1986]	<u>C1.X</u> , D28. 6 , D323.2, E71. 14
VESSEL, ADDITIVE SHOT POT, INTERCAT, MODEL INTERCAT 50, PORTABLE , NOX REDUCING CATALYST, <u>SOX REDUCING CATALYST, AND CO PROMOTER</u> , WITH <u>PNEUMATIC CATALYST LOADING/UNLOADING</u> MANUAL SYTEM FOR INJECTION OR VACUUM, WIDTH: 5 FT; HEIGHT: 8 FT; LENGTH: 3 FT A/N: 398322 462618	D2659	C2662	PM: (9) [RULE 404, 2-7-1986; RULE 405, 2-7-1986]	<u>C1.X</u> , D28. 6 , D323.2, E71. 14
VESSEL, ADDITIVE SHOT POT, INTERCAT, MODEL INTERCAT 200, PORTABLE , NOX REDUCING CATALYST, <u>SOX REDUCING CATALYST, AND CO PROMOTER</u> , WITH <u>PNEUMATIC CATALYST LOADING/UNLOADING</u> MANUAL SYTEM FOR INJECTION OR VACUUM, WIDTH: 5 FT; HEIGHT: 8 FT; LENGTH: 3 FT A/N: 398322 462618	D2660	C2663	PM: (9) [RULE 404, 2-7-1986; RULE 405, 2-7-1986]	<u>C1.X</u> , D28. 6 , D323.2, E71. 14

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Process 3: FLUID CATALYTIC CRACKING				
FILTER, CARTRIDGE TYPE, OUTER DIAMETER: 1 FT; INNER DIAMETER: 8 IN; LENGTH: 1FT 8 IN A/N: 398322 462618	C2661	D2658		A72.2, D322.4, D381.2, K67.8
FILTER, CARTRIDGE TYPE, OUTER DIAMETER: 1 FT; INNER DIAMETER: 8 IN; LENGTH: 1FT 8 IN A/N: 398322 462618	C2662	D2659		A72.2, D322.4, D381.2, K67.8
FILTER, CARTRIDGE TYPE, OUTER DIAMETER: 1 FT; INNER DIAMETER: 8 IN; LENGTH: 1FT 8 IN A/N: 398322 462618	C2663	D2660		A72.2, D322.4, D381.2, K67.8

BACKGROUND:

This application was filed for a modification of the FCCU catalyst handling system to allow the three shot pot loaders (SPL) currently handling only DeNOx additive to also load the SOx reducing additive and CO promoter. This application was originally submitted as Class I, but later changed to Class III as the equipment has been used for loading the additional materials. This modification is mainly for the operational flexibility. In the current application A/N 398322, the shot pot loaders and associated equipment were originally listed in the FCC unit, Process 3, System 1 and issued a PC on 12/20/02. However, since this equipment is only used to provide the catalyst for the FCCU, it was later moved to a separate system, the FCC catalyst handling facility No. 2, Process 3, System 8.

In this application, there will be some changes in equipment description as shown above, in bolded and underlined letters. The shot pots are portable and the loaders are either on wheels or skid mounted. Those changes were requested to reflect their actual description of the equipment.

Permit history

Previous Permit	Date	Application Description
462618		Current application to add SOx reducing additive and CO promoter
398322 PC	12/20/02	New construction three loaders with filters
375457 PC	12/20/00	Rule 441 research permit to install three loaders with filters

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COMPLIANCE RECORD REVIEW

A check of the AQMD compliance database for the compliance activity of this facility from 07/01/10 to the present determined that there were no specific violations reported for this system.

PROCESS DESCRIPTION

Fluid Catalytic Cracking (FCC) Unit employs a catalyst that acts like a fluid when aerated in vapor. The fluidized catalyst is circulated continuously between the reaction zone and regeneration zone of the FCC to perform as a vehicle for heat transfer from the regenerator to the oil feed and reactor. The fresh feed and recycle feed stream are preheated by a furnace prior to entering the FCC unit at the base of the feed riser, where they are mixed with the hot regenerated catalyst. The cracking reaction starts when the feed contacts the hot catalyst in the reactor. The hydrocarbon vapors produced by the reaction are sent to the fractionator column for separation into liquid and gaseous products.

The spent FCC catalyst leaving the reactor contains hydrocarbons and coke adsorbed on its surfaces from the cracking process. Coke is burned off from the catalyst with air in a complete combustion process in the FCC regenerator that generates NOx, SOx, VOC, CO and lesser amounts of toxics. SOx, NOx reducing additives and CO promoter are being used in the FCC unit at BP to control these emissions. Flue gas from the FCC currently flows through a waste heat boiler, electrostatic precipitators (ESP) and a selective catalyst reduction (SCR) prior to being discharged into the atmosphere.

The above described catalyst handling facility consists of shot pot loaders (SPL) that mixes NOx, SOx reducing additives and CO promoter into the FCCU fresh catalyst makeup stream. These additives are delivered by a manual injection system driven by compressed air. The injection system is also used to create vacuum to transfer the materials from a shipping container (a drum or tote) into the shot pots. Each shot pot is equipped with a cartridge filter that captures dust created in the air space during vacuuming and depressurizing process after the injection of the additive. Although different additives may be loaded into the shot pots and injected into the FCC regenerator as a batch operation, their total maximum loading rate for the three shot pots remains unchanged at 150 lb/hr. The simplified schematic of the SPL and details of the process can be found in attachment A.

This equipment was originally permitted for loading NOx reducing additive only. Later, BP also used the pot shots to load SOx reducing additive and CO promoter. Currently, the primary use of this equipment is for loading CO promoter on as needed basis. FCC unit occasionally experiences afterburn, in which CO oxidizes to CO2 in the regenerator or flue gas system. Afterburn causes high temperature and possible mechanical damage

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to the FCC equipment. The injection of CO promoter helps the CO oxidation to occur in the catalyst bed where the generated heat can be absorbed by the catalyst. The injection of CO promoter also drives full combustion/reaction to the preferred location in the system. The shot pot is only used for loading SOx reducing additive during upset/breakdown scenario when the normal receiving hopper has trouble injecting the SOx additive into to the system.

The NOx/SOx additives and CO promoter are shipped and stored in 200-lb drums. There is no change to the operation or feed rates of the FCCU as a result of the proposed modifications.

EMISSIONS CALCULATION:

Since the total maximum usage of these shot pots remains the same at 22,200 lb/month, or on an average of 30.8 lb/hr after the modification, the addition of SOx additive and CO promoter to their operations will not result in a change in PM emissions. Particulates are the main source of emissions from this equipment. The particulate emissions were estimated based on source test results and information provided for P/C evaluation, A/N 398122:

Maximum loading rate: 22,200 lb/month of additives
Emission factor: 0.00056 lb PM/lb of loading additives
Controlled PM emissions =
22,200 lb/mo of additives x .00056 = 12.432 lb/mo or 0.41 lb/day

For Rule 404 - PM concentration (gr/cf):
Exhaust flow rate: 150 scfm (Attachment B)
(0.017 lb/hr) (7000 gr/lb) (hr/60 min) (min/150 scf) = 0.013 gr/cf

RULE REVIEW

Rule 212 - Standards for Approving Permits

The equipment affected by this project is expected to continue to operate without emitting air contaminants in violation of the State Health and Safety Code of in violation of SCAQMD’s rules and regulations. This equipment is not located within 1000 feet of a school. Since the PM emissions from the equipment are negligible, it is not expected to cause cancer risk greater than, or equal to, one in a million (1x10-6) during a lifetime of 70 years or pose a risk of nuisance. Public notice under Rule 212(g) is not required for this modification.

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Rule 401 & 402 - Visible Emissions & Nuisance

With proper operation and maintenance, the subject equipment is not expected to produce visible and public nuisance. Compliance with this rule is expected.

Rule 404 - Particulate Matter – Concentration

This rule limits the particulate matter concentration to a max of 0.196 grain per cf. From the above calculations, the PM concentration of this equipment is 0.022 gr/scf, which is well below the allowable limit. Compliance with this rule is expected.

Rule 405 - Solid Particulate Matter – Weight

The PM limit set by this rule is 0.99 lb/hr of solid PM (150 lb/hr process weight). With the PM emission of 0.03 lb/hr, BP is in compliance with this rule.

Reg. XIII - New Source Review:

This regulation applies to any new, modified or relocated source which results in an emission increase of any non-attainment air contaminant, any ozone depleting compound, or ammonia.

The change to use the equipment for also loading DeSOx additive and CO promoter does not result in any increase for PM emissions. Therefore, the modification does not trigger BACT, offset or modeling requirements.

Reg. XIV - Toxics and Other Non-Criteria Pollutants

Rule 1401 – New Source Review of Carcinogenic Air Contaminants

Since the PM emissions from the equipment are negligible, it is not expected to cause a maximum individual cancer risk greater than one in a million nor hazard indices greater than one. Compliance with this rule is expected.

Reg. XVII - Prevention of Significant Deterioration (PSD)

This regulation applies to pollutants which have attained the ambient air standards in South Coast Air Basin. These include NO₂, SO₂ and lead. The change does not result in an increase in emissions of these pollutants and therefore it is not subject to the requirements of this regulation.

Reg. XX - Regional Clean Air Incentives Market (RECLAIM)

BP Carson refinery is a cycle II RECLAIM facility. The proposed change does not cause any NO_x and SO_x emission increase. The facility is expected to continue to comply with the requirements of this regulation.

Reg. XXX - Title V Operating Permits

Rule 3002 requires that no person shall construct, modify, or operate equipment located at a Title V facility without first obtaining a Title V permit or permit revision that allows the construction, or modification. This facility is subject to and complies with Title V

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requirements. On September 1, 2009, BP's initial Title V permit became effective and has been revised.

This project is considered to be a "Minor Permit Revision" as it does not cause any emission increase or requires significant changes in monitoring conditions or relaxes recordkeeping, reporting requirements in the permit. The proposed Title V permit revision will be submitted to EPA for a 45-day review.

DISCUSSION

The changes to the FCC shot pots to allow loading DeSOx additive and CO promoter does not result in any increase in emissions as shown above. The calculations have showed that the maximum potential emission from this equipment is 0.03 lb/hr PM. In summary, the addition of DeSOx additive and CO promoter has caused no emission impact or change to the throughput of the equipment.

CONCLUSION/ RECOMMENDATION:

The above equipment has operated in compliance with all applicable rules and regulations of the District. Permit to Construct is recommended to be issued to BP Carson Refinery subject to the following conditions:

Conditions: A72.2, C1.X, D28.6, D322.4, D323.2, D381.2, E71.14, K67.8.

A72.2 THE OPERATOR SHALL MAINTAIN THIS EQUIPMENT TO ACHIEVE A MINIMUM OVERALL CONTROL EFFICIENCY OF 99.0 PERCENT FOR PM10 DURING ~~THE~~ NORMAL OPERATION ~~OF THE EQUIPMENT IT VENTS~~.

RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(b)(2) – Offset, 5-10-1996

C1.X THE OPERATOR SHALL LIMIT THE TOTAL THROUGHPUT FOR THE THREE SHOT POT LOADERS TO NO MORE THAN 22,200 POUNDS IN ANY ONE CALENDAR MONTH.

RULE 1303(B)(2) – OFFSET, 5-10-1996

D28.6 THE OPERATOR SHALL CONDUCT SOURCE TEST(S) IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:

The test shall be conducted initially to determine emission rates of PM and PM10 from the discharge of the pneumatic catalyst loading/unloading system during unloading of SOx reducing catalyst and CO promoter additive from a shipping container into the shot pots, and the control efficiencies of the filters.

The test shall be conducted at least once every 12 months to determine emission rates of PM and PM10 from the discharge of the ~~vacuum~~ pneumatic catalyst loading/unloading system during unloading of an

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additive from a shipping container into the shot pots, and the control efficiencies of the filters. If the shot pot loaders do not operate more than 30 days in a 12-month period, a test is not required.

~~The test shall be conducted initially and annually if the equipment is utilized for more than 30 days in a calendar year.~~

Source test shall be conducted when this equipment is operating at least 80 percent of the permitted maximum capacity or within a capacity range approved by the District. Report of the test and operating condition of the equipment shall be submitted to the District within 60 days after the test.

The District shall be notified of the date and time of the test at least 10 days prior to the test.

The test shall be conducted according to an approved test protocol. The operator shall submit the test protocol to the District at least 60 days prior to the initial testing.

RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(b)(2) – Offset, 5-10-1996

D322.4 THE OPERATOR SHALL PERFORM ANNUAL INSPECTION OF THE EQUIPMENT AND FILTER MEDIA FOR LEAKS, BROKEN OR TORN FILTER MEDIA, AND IMPROPERLY INSTALLED FILTER MEDIA.

RULE 3004(A)(4)-Periodic Monitoring, 12-12-1997; RULE 401, 3-2-1984; RULE 401, 11-9-2001; RULE 404, 2-7-1986]

D323.2 THE OPERATOR SHALL CONDUCT AN INSPECTION FOR VISIBLE EMISSIONS FROM ALL STACKS AND OTHER EMISSION POINTS OF THIS EQUIPMENT WHENEVER THERE IS A PUBLIC COMPLAINT OF VISIBLE EMISSIONS, WHENEVER VISIBLE EMISSIONS ARE OBSERVED, AND ON AN ANNUAL BASIS, AT LEAST, UNLESS THE EQUIPMENT DID NOT OPERATE DURING THE ENTIRE ANNUAL PERIOD. THE ROUTINE ANNUAL INSPECTION SHALL BE CONDUCTED WHILE THE EQUIPMENT IS IN OPERATION AND DURING DAYLIGHT HOURS.

IF ANY VISIBLE EMISSIONS (NOT INCLUDING CONDENSED WATER VAPOR) ARE DETECTED THAT LAST MORE THAN THREE MINUTES IN ANY ONE HOUR, THE OPERATOR SHALL VERIFY AND CERTIFY WITHIN 24 HOURS THAT THE EQUIPMENT CAUSING THE EMISSION AND ANY ASSOCIATED AIR POLLUTION CONTROL EQUIPMENT ARE OPERATING NORMALLY ACCORDING TO THEIR DESIGN AND STANDARD PROCEDURES AND UNDER THE SAME CONDITIONS UNDER WHICH COMPLIANCE WAS ACHIEVED IN THE PAST, AND EITHER:

- 1). TAKE CORRECTIVE ACTION(S) THAT ELIMINATES THE VISIBLE EMISSIONS WITHIN 24 HOURS AND REPORT THE VISIBLE EMISSIONS AS A POTENTIAL DEVIATION IN ACCORDANCE WITH THE REPORTING REQUIREMENTS IN SECTION K OF THIS PERMIT; OR
- 2). HAVE A CARB-CERTIFIED SMOKE READER DETERMINE COMPLIANCE WITH THE OPACITY STANDARD, USING EPA METHOD 9 OR THE PROCEDURES IN THE CARB MANUAL "VISIBLE EMISSION EVALUATION", WITHIN THREE BUSINESS DAYS AND REPORT ANY DEVIATIONS TO AQMD.

THE OPERATOR SHALL KEEP THE RECORDS IN ACCORDANCE WITH THE RECORDKEEPING REQUIREMENTS IN SECTION K OF THIS PERMIT AND THE FOLLOWING RECORDS:

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- 1). STACK OR EMISSION POINT IDENTIFICATION;
- 2). DESCRIPTION OF ANY CORRECTIVE ACTIONS TAKEN TO ABATE VISIBLE EMISSIONS;
- 3). DATE AND TIME VISIBLE EMISSION WAS ABATED; AND
- 4). ALL VISIBLE EMISSION OBSERVATION RECORDS BY OPERATOR OR A CERTIFIED SMOKE READER.

[RULE 3004(A)(4)-Periodic Monitoring, 12-12-1997; RULE 401, 3-2-1984; RULE 401, 11-9-2001]

D381.2 THE OPERATOR SHALL CONDUCT AN INSPECTION FOR VISIBLE EMISSIONS FROM ALL STACKS AND OTHER EMISSION POINTS OF THIS EQUIPMENT WHENEVER THERE IS A PUBLIC COMPLAINT OF VISIBLE EMISSIONS, WHENEVER VISIBLE EMISSIONS ARE OBSERVED, AND ON A QUARTERLY BASIS, AT LEAST, UNLESS THE EQUIPMENT DID NOT OPERATE DURING THE ENTIRE QUARTERLY PERIOD. THE ROUTINE QUARTERLY INSPECTION SHALL BE CONDUCTED WHILE THE EQUIPMENT IS IN OPERATION AND DURING DAYLIGHT HOURS. IF ANY VISIBLE EMISSIONS (NOT INCLUDING CONDENSED WATER VAPOR) ARE DETECTED, THE OPERATOR SHALL TAKE CORRECTIVE ACTION(S) THAT ELIMINATES THE VISIBLE EMISSIONS WITHIN 24 HOURS AND REPORT THE VISIBLE EMISSIONS AS A POTENTIAL DEVIATION IN ACCORDANCE WITH THE REPORTING REQUIREMENTS IN SECTION K OF THIS PERMIT.

THE OPERATOR SHALL KEEP THE RECORDS IN ACCORDANCE WITH THE RECORDKEEPING REQUIREMENTS IN SECTION K OF THIS PERMIT AND THE FOLLOWING RECORDS:

- 1). STACK OR EMISSION POINT IDENTIFICATION;
- 2). DESCRIPTION OF ANY CORRECTIVE ACTIONS TAKEN TO ABATE VISIBLE EMISSIONS; AND
- 3). DATE AND TIME VISIBLE EMISSION WAS ABATED.

[RULE 3004(A)(4)-Periodic Monitoring, 12-12-1997; RULE 401, 3-2-1984; RULE 401, 11-9-2001]

E71.14 THE OPERATOR SHALL NOT USE THIS EQUIPMENT TO LOAD ADDITIVES UNLESS THE **TOTAL** LOADING RATE FOR **THE THREE SHOT POTS** IS LESS THAN 150 POUNDS PER HOUR.

[RULE 1401, 6-15-2001]

K67.8 THE OPERATOR SHALL KEEP RECORDS, IN A MANNER APPROVED BY THE DISTRICT, FOR THE FOLLOWING PARAMETER(S) OR ITEM(S):

The name of the person performing the inspection and/or maintenance of the filter media

The date, time, and results of the inspection

The date, time, and description of any maintenance or repairs resulting from the inspection

[RULE 3004(A)(4)-Periodic Monitoring, 12-12-1997; RULE 401, 3-2-1984; RULE 401, 11-9-2001; RULE 404, 2-7-1986]